



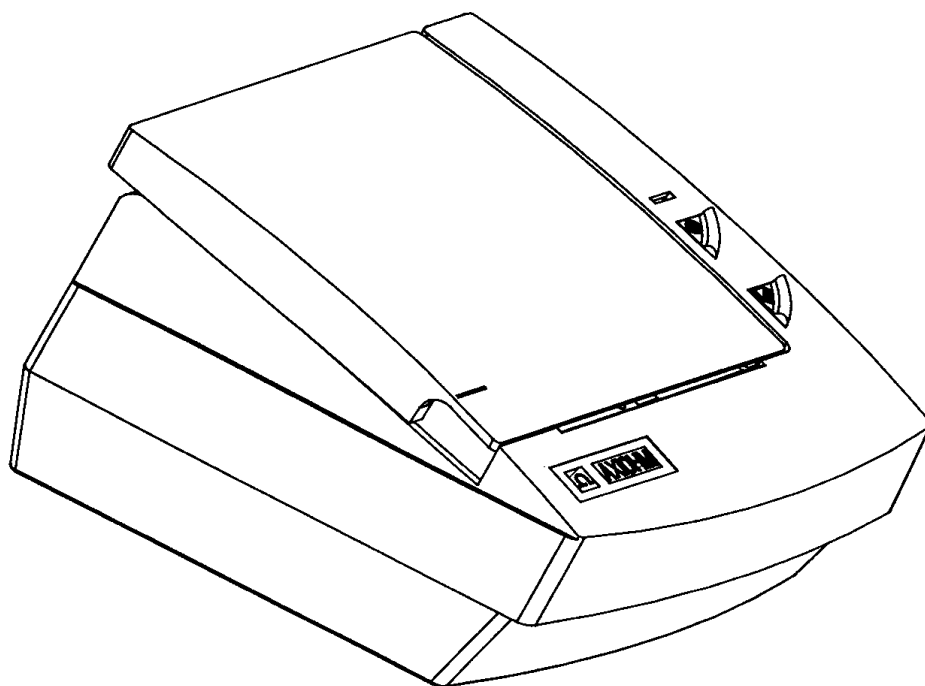
THERMAL PRINTING SOLUTIONS

APOS PRINTER SERIES

8 dots/mm

USER MANUAL

Reference 3107082 Issue Z
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AXIOHM
1, rue d'Arcueil, BP 820
92542 MONTROUGE CEDEX, FRANCE
Tel : (33) 1 58 07 17 17, Fax : (33) 1 58 07 17 18

EVOLUTIONS

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1 GENERAL DESCRIPTION

This set-up guide describes how to set up and operate the high-speed, thermal, point-of-sale (POS) printer manufactured by Axiohm S.A.R.L. The printer has many features, which give advantages to retailers, and is versatile enough to be used in other applications such as for printing out tickets and coupons.

Axiohm's unique and patented paper-loading mechanism makes this printer the easiest-to-use POS printer on the market. The fixed-head thermal printer engine gives a very high quality print.

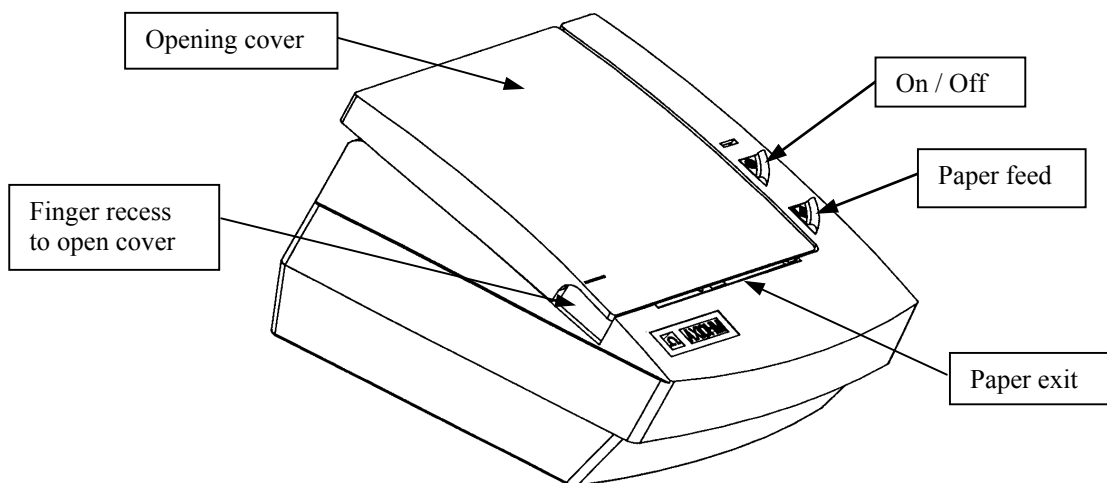
An untrained operator can change the roll of paper quickly and reliably, minimizing downtimes and avoiding paper jams. There are no messy ribbons to change, so good print quality can be 'designed-in' without operator skills or regular maintenance.

The printer uses Axiohm's proprietary thick-film technology to achieve the longest-life print heads on the market, as well as the longest-life cutter with the optional patented semi-rotating ceramic cutter.

As part of the total 'easy-to-use' philosophy, the printer uses a super-set of industry-standard software to allow for easy installation. The existing software needs no modification and is ready to use.

The APOS printer will accurately print many barcodes, it allows custom characters to be downloaded and it can execute macro functions.

Interfaces offered: RS232 for greatest compatibility
 Centronics parallel version.





2 SPECIFICATIONS

2.1 *Physical specification*

2.1.1 Dimensions

Height	115mm
Width	170mm
Depth	205mm
Weight (with cutter)	1390 g

2.1.2 Print specification

The APOS printer uses a fixed-head thermal print head designed and manufactured by Axiohm, using proprietary thick-film techniques to ensure the highest performance.

Print head type:	Thermal line	
Printing width:	72 mm	
Number of dots across width:	576	
Resolution (dot-density):	8 dots / mm	
Character fonts	A	12 x 24 (48 columns)
	B	7 x 17 (64 columns)

2.1.3 Power supply

The printer requires a power supply of 24V at 2A minimum. Other voltages, which are required internally for the micro controller and the communications ports, are generated internally from the 24V supply.

Specification:

Output voltage: 24 VDC (no load)
Output current: 2.0 A mean continuously
10 A peak during 4ms max (pulse cycle =30ms)



2.2 *Environmental specifications*

2.2.1 Environmental conditions

Operating temperature:	0°C - +50°C
Storage temperature:	-40°C - +70°C
Maximum humidity:	90% RH (non-condensing)

2.2.2 EMI and Safety Standards Applied

Europe CE marking:
 Directive: 89/336/EEC
 EN55022 Class A
 Safety Standard: EN 60950

North American EMI: FCC/ICES-003 Class A
 Safety Standards: UL60950: 2000
 cUL60950: 2000



2.3 Operational performance

2.3.1 Data hold up

A backup capacitor is fitted to the APOS printer to hold up RAM data for a minimum of 1.5 hrs after losing external power. This means that all downloaded fonts, logos and bitmaps will be retained for the data hold up period. However, the context of the printer is not saved, which means that the printer will revert to its initial state when power is returned.

2.3.2 Paper specification

Paper width	80mm
Maximum paper roll diameter	80mm
(Maximum paper roll length)	82m (using 60gsm paper)
Recommended papers	AXIOHM ref 3101123 KANZAKI F380
Emulsion (sensitive) side	On outside of roll

* You must contact Axiohm if you wish to use an alternative type of paper; otherwise your warranty might not be valid and you could cause damage to your printer.

2.3.3 Speed

The printer is capable of printing at a maximum speed of 60mm/s with 40% of the dots on (during 40% of the time), provided that sufficient power supply current is available (See section 2.1.3 about power supply requirements). The printer can achieve a speed of approximately 50mm/s when printing simple text using the standard 2A power supply unit.

The actual speed can also be affected by the data rate at which information is sent to the printer over the communication link. Sending large amounts of graphic data could reduce the actual speed.

2.3.4 Lifetime

The printer lifetime depends on the actual operating conditions and is defined by the MTBF of the electronics and the wear characteristics of the electromechanical parts. The actual lifetime will therefore be the minimum of the following three categories, depending on the particular application:

- Electronic MTBF of 40,000 hrs of powered use
- 90km of paper used by the printer (with typically 15% of the dots heated)
- One million cuts from the ceramic cutter mechanism.



2.4 Warranty

The printers or spare parts are guaranteed for a period of 6 (six) months, beginning at the delivery date (ex-works).

The printers are guaranteed against defective material and/or workmanship. The warranty covers only, and at AXIOHM's choice, the cost of repair or replacement by AXIOHM in its factory, after restitution by the customer of the printers or spare parts confirmed by AXIOHM to be defective (*excluding assembling, dismounting, shipping and other expenses*).

The implementation of the warranty will not extend the warranty period.

Due to the complexity of the electronic and mechanical techniques used in the operation of such a printer, AXIOHM does not warranty problems resulting from an installation not according to the published specifications.

This warranty is subject to strict compliance with AXIOHM's technical instructions for installation, use and maintenance.

- In particular, this warranty will not be valid for any defects due to:
- Use of thermal paper other than those recommended by AXIOHM.
- Incorrect maintenance.
- Defective installation or modification not approved by AXIOHM.
- Non-compliance, during any period, with the specified working conditions including the electrical power supply specifications.
- Abnormal wear or mechanical damage, including dot burning due to power overloads.
- Transportation in packaging other than the type of carton / foam insert in which the printer was originally packed.

Any transportation, storage or setting up which does not comply with the technical specifications given to the customer by AXIOHM, or its official distributor, will invalidate this warranty.

In no event shall AXIOHM assume any liability in excess of that defined above. It is agreed that AXIOHM will not be liable for any indemnity for accidents to persons, damage to property or for loss of earnings.

2.5 Order Codes

The APOS printer is available in many variants. The table below shows the valid product codes that are used to describe each version.

The APOS part number is made up of 8 digits thus: **APOS** < x1> < x2> 0 E

Cutter

X1 = 1 : No cutter fitted

X1 = Y : With cutter

Interface

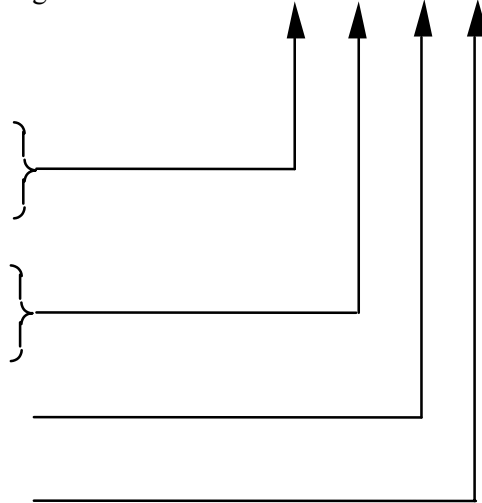
X2 = 2 : RS232

X2 = C : Centronics

0

Power Supply : E = Europe

G = Great Britain



Example

APOSY2OG: printer supplied for use in Great Britain, with a cutter and an RS232 interface.

Note: Axiohm can supply custom versions of the APOS printer to suit specific applications. In this case, the product code will be **APOSSxxx**, where **S** stands for customized and **xxx** is a chronological serial number starting at **S000** defining the special version.



3 YOUR PRINTER

3.1 *Getting ready to use the printer*

3.1.1 Unpacking the printer

The printer comes in a plain cardboard carton with a reusable packing foam insert and separate pockets for:

- One APOS printer
- One set-up guide
- One single 80m roll of thermal paper
- One standard power supply with 24V power lead (optional)
- One 1.8 m CEE22 power cable, with appropriate mains plug for the country of sale

The model number and serial number (including manufacturing week and batch number) of the printer will be marked on the exterior of the packaging.

Make sure that no parts are missing or damaged. Report any deficiency to your supplier as soon as possible after receiving the printer. The original packaging material should be kept to transport or return your printer, if necessary.

3.1.2 Description of printer parts

The APOS printer contains a patented easy-loading printer mechanism designed and manufactured by Axiohm. This mechanism consists of a main cavity into which a paper roll is dropped for loading. The thermal print head is in front of this cavity and a rubber roller is attached to the lid of the mechanism. When the lid is closed, the paper is trapped between the rubber roller and the print head to give close alignment and consistent pressure.

3.1.3 Buttons

The APOS printer has two buttons on the front panel:

The ON/OFF button is physically connected to the hard reset on the main controller board. Even when it is OFF, the printer is always powered.

The Paper Feed button's normal function is to advance paper when the unit is not printing. The button function may be disabled under software control and it can be used to control the action of a defined macro. This button also activates a self-test printout (see section 2.7).

3.1.4 Indicator

A rectangular green LED is used to indicate the basic status of the printer. The LED is “off” when the printer is off, and “on” under normal circumstances when the printer is on. It will flash when there is an “error condition” such as when it is out of paper.



3.1.5 Cutter

The printer may be fitted with Axiohm's patented semi-rotating ceramic cutter. It is split with one blade in the lower cavity and the other fitted to the lid. These blades are also correctly aligned when the lid is closed to make paper loading very easy and jam-free. Partial cuts or full cuts are possible under software control.

3.1.6 Connectors

The APOS printer can have up to 3 types of connectors:

Power connector: fitted to the base of the unit near the front. (See section 2.5.1 for detail)

Interface connector: fitted to the base of the unit closer to the rear; a 9-pin D-type in the case of serial communication RS232, or a 25-pin D-type in the case of parallel communications (Centronics option). (See section 2.5.2 for detail)

Drawer kick-out connectors (two): fitted at the rear of the printer. These appear as a pair of RJ11 connectors. (See section 2.5.3 for details)

3.1.7 Cable traps

Three clips are fitted into the base of the printer; they may be used to trap the power supply and interface cables into recessed channels in the base.

3.1.8 Mounting holes

There are two holes in the base of the printer that allow the printer to be attached to a vertical surface such as a wall or pillar. In this case, the printer should be mounted with the paper exiting from the top so that the roll does not fall out when opening the cover.

3.1.9 Sensors

The APOS printer is fitted with three sensors, which detect abnormal conditions:

Door-closed sensor: a micro-switch sensor. To avoid damaging the print head, when the door is open, printing is inhibited.

End-of-paper (EOP) sensor: detects the presence of paper near the print head. To avoid damaging the print head, when no paper is detected, printing is inhibited.

Cutter sensor: used to detect if the cutter is in its home position before commencing a cut, and on completion of a cut.

3.2 Choosing the proper location for your printer

The APOS printer may be installed in a variety of applications; but, to maintain optimum working conditions from your unit, the following recommendations should be followed:

- Avoid dirty or dusty locations, or those with excessive heat or humidity
- Choose a stable level base or solid wall on which to mount the printer
- Make sufficient space around the printer to ensure comfort while using your printer, including sufficient access to open the lid while changing paper.

3.3 Loading paper

It is extremely easy to load a new paper roll into the printer by following these simple steps:

- Open the cover and remove the old paper core;
- Drop the new roll into the reservoir so that it will rotate in the correct direction (i.e. so that the emulsion side of the paper rests against the print head)
- Hold the front edge of the paper outside the main cavity at the front of the printer
- Close the printer cover

3.4 Light indicator

When the light is on continuously, the printer is ready to operate.
When the light is flashing, this signals that an error has occurred.

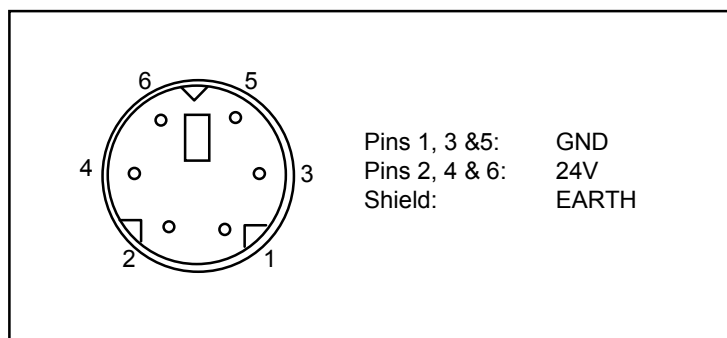
3.5 Connectors & cables

To reduce the electromagnetic emissions and susceptibility, all cables should be screened. If you are not using cables supplied by Axiohm for this purpose, please ensure that your cables match the printer and are rated at the appropriate voltage and current capacities.

***Use of an inappropriate cable may seriously damage your printer!**

3.5.1 Power connector

The connector is a shielded 6-pin female mini-Din plug.



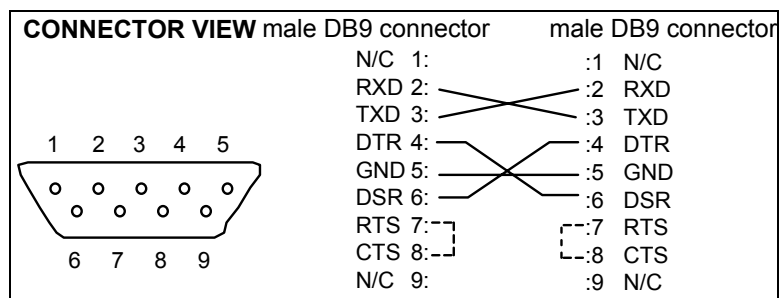
3.5.2 Communications interface connectors

RS232 interface uses 9-pin D-type male connectors

Centronics interface uses a 25-pin D-type female connector.

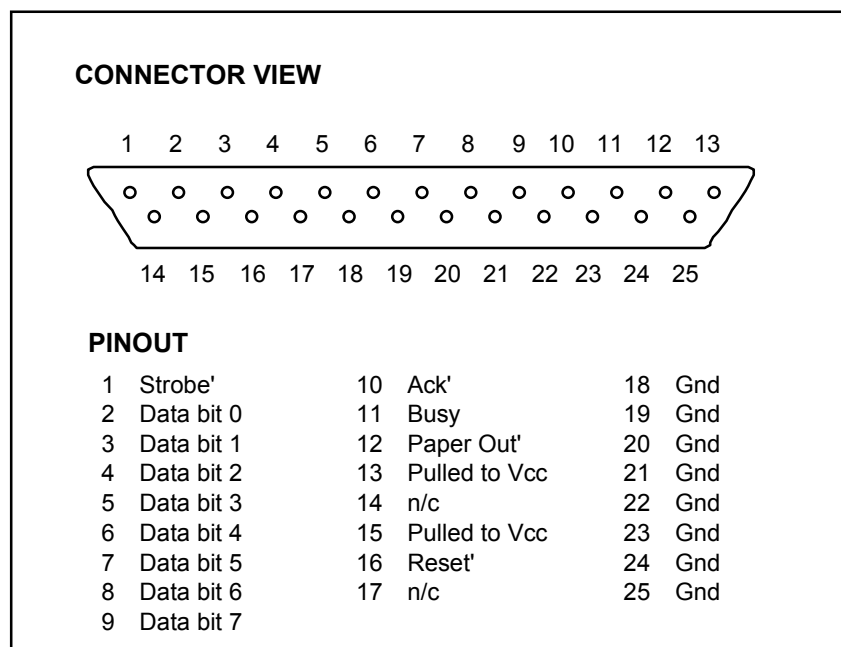
RS232 Connector

Cable for DTR/DSR protocol



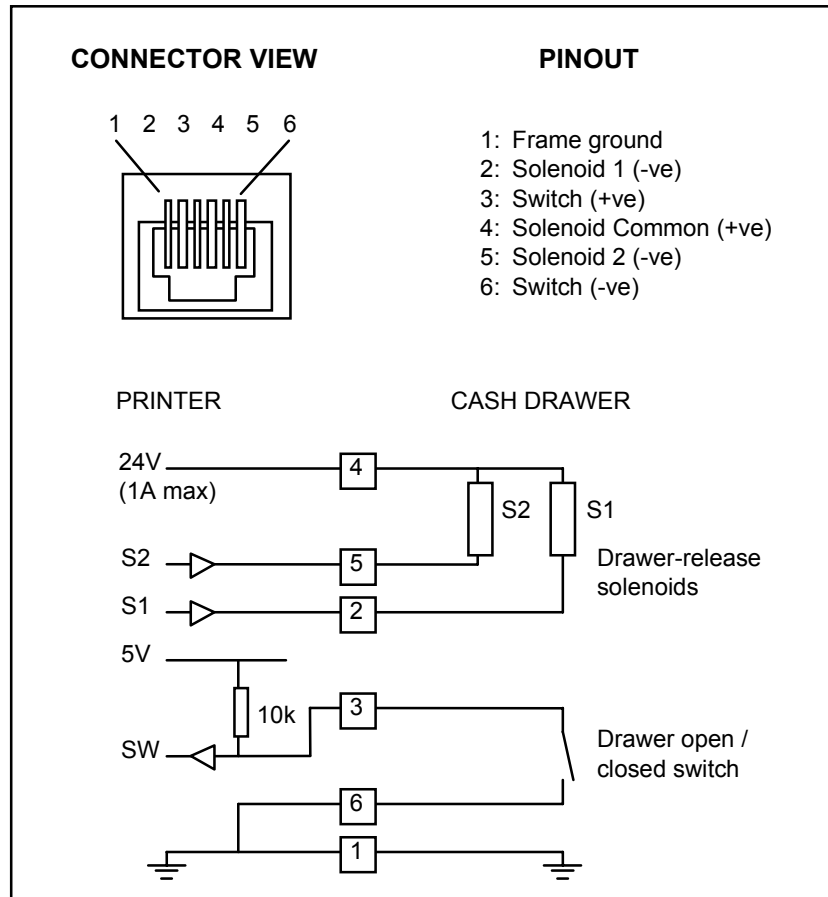
Note: RTS/CTS should be tied together if using DOS print commands on a PC station.

Centronics Connector



3.5.3 Drawer kick-out connector

The connector used to open a cash drawer and monitor, whether the drawer is opened or closed, is a 6-pin modular RJ11 connector.



3.6 Configuration of the switches

Respect the following procedure in order to set the switches:

- Switch the printer off
- Set the switches as requested (see tables below)
- Switch the printer on

3.6.1 RS232 mode

Switches 1,2,3 and 6 are used to define functions. Switches 4 and 5 are used to set the data transmission speed (see Annex B1 for RS232 timing).

Switch	ON	OFF
1	XON/XOFF control	DTR/DSR
2	No Parity	Parity
3	Odd parity	Even parity
6	(not used)	(not used)

Switch numbers 4 and 5 are used to define the baud rate as follows:

Baud rate	Switch 4	Switch 5
4800	OFF	OFF
9600	ON	OFF
19200	OFF	ON
38400	ON	ON

3.6.2 Centronics mode

All switches should be set OFF for printers equipped with Centronics connectors.

3.7 Self test

A self-test is obtained by pressing the paper feed button during a reset (power up or pressing on/off button). On entering the self-test mode, the printer checks its internal hardware and prints a report with the following information:

- product reference and software version
- serial number
- whether a cutter is fitted or not
- what type of interface is fitted
- switch settings (but not for Centronics versions)
- address of printer (RS485 versions)
- print density adjustment setting (set via software)
- internal RAM status



4 TROUBLE SHOOTING

Problem	Possible Causes and What to Do
a) Printer Problems:	
Light is off.	Check that the power-supply and cables connections are properly connected.
Light is continuously on, but printer does not operate.	Check to see if the interface cable is properly connected.
Light is flashing.	Check that the cover is closed properly. Open the cover and make sure that there is paper left in the printer. Open the cover and check that there is no paper jam; if so, unwind the paper until there are no more wrinkles and close the cover with the wrinkled part out.
Printer does not function when turned on.	Check that the printer cables are properly connected on both ends. Check that the host or power supply is getting power. Check that the receipt cover is fully closed.
b) LED Problems:	
Slow continuous flashing.	You may be out of paper; put in a new paper roll.
	Cover off; put the cover on.
	Knife is unable to home; contact your authorized service representative.
	Print head is too hot; printing will resume when head cools.
	Out of range voltages.
c) Printing Problems:	
Printing quality is deteriorating	Print head may be getting dirty; see "Cleaning your Printer".
Colored stripe on the receipt.	Paper is low; change the paper roll.
Receipt does not come out all the way.	Paper is jammed; open the receipt cover, inspect the knife and remove any jammed paper.
Printer starts to print, but stops while the receipt is being printed.	
Receipt is not cut.	
Print is light or spotty.	Check that the paper is loaded properly.
	The print head is dirty; use recommended thermal receipt paper.
	Variations in paper; increase print density in "Set Hardware Options" of printer Configuration Menu as needed.
Vertical column of print is missing.	Serious printer electronics problem; contact your authorized service representative.
One side of receipt is missing.	Serious printer electronics problem; contact your authorized service representative.

5 CLEANING YOUR PRINTER

The APOS printer is a highly reliable unit, which requires very little maintenance but may benefit from cleaning as described in the next sections.

Before cleaning, unplug all electrical connections.

5.1 Cleaning the printer

Keep the external surfaces clean by wiping with a lightly damp cloth. Make sure that the inside surfaces are kept dry at all times, and that the external surfaces are thoroughly dry before re-connecting.

5.2 Cleaning the print head

Depending of the environment in which the printer is used, the print head may accumulate dust. Therefore it is necessary to clean it periodically in order to maintain a good print quality. The cleaning period depends on the environment and the usage of the printer, but it should be cleaned at least once a year or up to once a month in heavy-duty applications. The print head should always be cleaned immediately if the print becomes visibly fainter due to contamination of the print head.

To clean the print head:

- Switch the printer off.
- **Never clean the head immediately after printing, it may still be hot.**
- Open the cover of the printer and remove the roll of paper.
- Clean the heating dots of the head with a cotton stick and a little alcohol solvent (ethanol, methanol or IPA), but **do not touch the print head with you fingers!**
- Allow the solvent to dry
- Reload the paper and close the cover

6 PRINTER CONTROL SOFTWARE

Control codes are non-printable characters or sequences of characters, which affect the subsequent operation of the printer. For your convenience, they are grouped below in logical sets of commands, which can be used in the same context.

Throughout the following descriptions of the commands you will note that three special codes are used to cause the printer to interpret the following byte or bytes as part of a command and not as printable characters. These codes are:

Code	Name	Dec. value	Hex. value	
ESC	Escape	27	1B	General “escape sequence” commands
GS	Graphic Sequence	29	1D	Often used for special graphic commands
AX	Axiohm	31	1F	Special commands for the APOS printer
FS	KANJI sequence	28	1C	General Kanji commands

The general command syntax is as follows:

Command

(Description)	Name and description of the command
(Format)	The code sequence to be sent to the printer. <nnh> is used to represent the hexadecimal number nn <nn> is used to represent the decimal number nn [] k is used when the sequence included in [] must be repeated k times
(Comments)	Additional information such as range allowed for the numbers or default values
(Cross reference)	Related commands



6.1 Commands

ESC =

(Description)	Select device
(Format)	<1Bh> <3Dh> <n>
(Comments)	<p>It allows the user to select a printer.</p> <p>If n = 0 all the printers are deselected.</p> <p>If n = 1 to 32, the printer with address #n s selected, all the other printers are deselected.</p> <p>If n = 33 all the printers are selected.</p> <p>The default value is n =1</p>
(Cross reference)	–

AX P

(Description)	Adjust print density
(Format)	<1Fh> <50h> <n>
(Comments)	<p>This command allows the user to vary the print density by adjusting the heating time between -32% and +10% of the nominal setting in 0.25% steps.</p> <p>The percentage variation □ % is given by</p> $\Delta\% = (n - 128) / 4$ $0 \leq n \leq 168$
(Cross reference)	–

ESC v

(Description)	Send printer status byte
(Format)	<1Bh> <76h>
(Comments)	<p>The printer will transmit a single byte, which reflects the status of the printer in accordance with the table below.</p> <p>This command is ignored if the printer is fitted with a Centronics interface because Centronics is not bi-directional.</p>
(Cross reference)	–

Bit	Function	bit = 0	bit = 1
0	(unused)	-	-
1	Door open	Close	Open
2	Paper	Present	Out
3	(unused)	-	-
4	(unused)	-	-
5	(unused)	-	-
6	(unused)	-	-
7	Cutter failure	No	Yes



AX V

(Description)	Send printer software version
(Format)	<1Dh> <56h>
(Comments)	The printer returns 4 characters representing the software version eg. "01.0" for Version 1.0
(Cross reference)	–

ESC @

(Description)	Initialize printer
(Format)	<1Bh> <40h>
(Comments)	Clears data in the buffer and initializes the printer settings.
(Cross reference)	–

ESC c5

(Description)	Enable / disable paper feed switch
(Format)	<1Bh> <63h> <35h> <n>
(Comments)	Paper feed disable if n is even Paper feed enabled if n is odd Default value is n = 0
(Cross reference)	–

ESC R

(Description)	Select international character set
(Format)	<1Bh> <4Ah> <n>
(Comments)	Modifies the set of printable characters in accordance with the table below. 0 <= n <= 10
(Cross reference)	–

		Ascii Character Code											
		23h	24h	40h	5Bh	5Ch	5Dh	5Eh	60h	7Bh	7Ch	7Dh	7Eh
n	Country	35	36	64	91	92	93	94	96	123	124	125	126
0	U.S.A.	#	\$	@	[\]	^	`	{		}	~
1	France	#	\$	É	•	ç	§	^	`	é	ù	è	..
2	Germany	#	\$	É	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	UK.	£	\$	@	[\]	^	`	{		}	~
4	Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	\$	@	•	\	é	^	ù	à	ò	è	ì
7	Spain	Pt	\$	@	ı	Ñ	ı	^	`	..	ñ	}	~
8	Japan	#	\$	@	[¥]	^	`	{		}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

ESC D

(Description)	Set tab positions
(Format)	<1Bh> <44h> [<n>] k <00h>
(Comments)	<p>n represents the nth character position at which you wish the tab to be set. To set k tabs on a line, <n> must be sent k times ensuring that $n_1 \leq n_2 \dots \leq n_k$</p> <p>The string of data must be terminated by the null character <00h>.</p> <p>eg.: The command <1Bh> <44h> <09h> <0Ch> <16h> <00h> will set 3 tabs such that, by using the command HT one, two or three times, you will be able to start printing on the 10th, 13th or 23rd column.</p> <p>The default value for tab positions is every 8 characters. Any change made to the width of the characters before setting the tabs will be included in the tabs' width; all the changes made after would be ignored.</p>
(Cross reference)	HT

ESC 3

(Description)	Define line spacing
(Format)	<1Bh> <33h> <n>
(Comments)	<p>The character line spacing is set to a pitch of $n/16$ mm</p> <p>$0 \leq n \leq 255$</p> <p>The default is $n = 68$ which is equivalent to about 4.2mm pitch.</p>
(Cross reference)	ESC 2

ESC 2

(Description)	Set to default line spacing
(Format)	<1Bh> <32h>
(Comments)	The default line spacing is 68/16 mm (about 4.2mm)
(Cross reference)	ESC 3

ESC SP

(Description)	Set spacing to right of characters
(Format)	<1Bh> <20h> <n>
(Comments)	<p>$0 \leq n \leq 32$, where n is specified in 1/8 mm units</p> <p>Default value is $n=0$</p> <p>If double-width mode is selected, the amount of space is doubled.</p>
(Cross reference)	–

ESC !

(Description)	Set print mode
(Format)	<1Bh> <21h> <n>
(Comments)	0 ≤ n ≤ 255 The value of n can be set to vary the mode of print according to the table below. Default value is n = 0 (ie. Font A in standard mode)
(Cross reference)	–

Bit	Function	Bit = 0	Bit = 1
0	Character Font	A	B
1	(not used)	-	-
2	(not used)	-	-
3	Emphasized	Cancelled	Set
4	Double height	Cancelled	Set
5	Double width	Cancelled	Set
6	(not used)	-	-
7	Underlined	Cancelled	Set

Front	Front Selected
A	12 × 24
B	9 × 17

ESC –

(Description)	Underline mode on / off
(Format)	<1Bh> <2Dh> <n>
(Comments)	0 ≤ n ≤ 2 If n=0, underline is turned off If n=1, underline mode of 1 dot-line thickness is selected If n=2, underline mode of 2 dot-line thickness is selected
(Cross reference)	–

ESC E

(Description)	Emphasized on / off
(Format)	<1Bh> <45h> <n>
(Comments)	The emphasized mode is selected if n is odd. The emphasized mode is cancelled if n is even.
(Cross reference)	ESC ! (set print mode)



ESC G

(Description)	Double-strike on / off
(Format)	<1Bh> <47>
(Comments)	The double-strike mode is selected if n is odd. The double-strike mode is cancelled if n is even.
(Cross reference)	ESC ! (set print mode)

ESC {

(Description)	Set / cancel upside-down character printing
(Format)	<1Bh> <7Bh> <n>
(Comments)	This command rotates the text by 180° so that it prints correctly when the printer is wall-mounted. Upside-down character is enabled if n is odd Upside-down character is disabled if n is even 0 <= n <= 255. Default value is n = 0 The command is valid only when it is used at the beginning of a line.
(Cross reference)	–

ESC V

(Description)	Set / cancel rotated characters
(Format)	<1Bh> <56h> <n>
(Comments)	This command allows each character to be rotated by 90° clockwise. 0 <= n <= 1 n = 0 cancels rotated printing n = 1 set rotating printing
(Cross reference)	–

HT

(Description)	Horizontal tab. moves the printing position to the next horizontal tab position
(Format)	<09h>
(Comments)	Default tabs are every 8 characters
(Cross reference)	ESC D (set tabs)



ESC \$

(Description)	Set absolute position
(Format)	<1Bh> <24h> <n1> <n2>
(Comments)	Sets the print starting position to the specified number of dots (1/8 mm units) from the beginning of the line so that the position is $(n1 + n2 \times 256)$ dots from the left hand side, where $0 \leq n2 \leq 1$ If $n2 = 0$: $0 \leq n1 \leq 255$ If $n2 = 1$: $0 \leq n1 \leq 192$ ie: $0 \leq (n1 + n2 \times 256) \leq 576$ If the position exceeds the print area, the command is ignored.
(Cross reference)	ESC ¥

ESC ¥

(Description)	Set relative position
(Format)	<1Bh> <5Ch> <n1> <n2>
(Comments)	Sets the print starting position to the specified number of dots (1/8 mm units) from the current printing position, where $0 \leq n2 \leq 1$ If $n2 = 0$: $0 \leq n1 \leq 255$ If $n2 = 1$: $0 \leq n1 \leq 192$ ie: $0 \leq (n1 + n2 \times 256) \leq 576$ If the position exceeds the print area, the command is ignored.
(Cross reference)	ESC \$

ESC a

(Description)	Set left, center or right justification
(Format)	<1Bh> <61h> <n>
(Comments)	Align the text to the specified position (left, center, right) Align left if $n=0$ (default) Align center if $n=1$ Align right if $n=2$ This command only works at the start of a new line.
(Cross reference)	–

LF

(Description)	Print contents of buffer and advance paper
(Format)	<0Ah>
(Comments)	Moves the print position to the beginning of the next print line
(Cross reference)	ESC 2, ESC 3



ESC d

(Description)	Print and line feed n character lines
(Format)	<1Bh> <64h> <n>
(Comments)	This command prints the line in the buffer and performs n blank lines including the line in the buffer. 0 <= n <= 255
(Cross reference)	–

ESC J

(Description)	Print and line feed n dot lines
(Format)	<1Bh> <4Ah> <n>
(Comments)	The printer prints the data in buffer, feeds the paper by n/16 mm and moves the print position to the beginning of the line. 0 <= n <= 255
(Cross reference)	LF, ESC d, ESC 2, ESC 3

ESC i

(Description)	Perform full cut
(Format)	<1Bh> <69h> <n>
(Comments)	The command is valid only when a cutter is fitted.
(Cross reference)	ESC m

ESC m

(Description)	Perform partial cut
(Format)	<1Bh> <6Dh> <n>
(Comments)	The command is valid only when a cutter is fitted.
(Cross reference)	ESC i

AX C

(Description)	Select cut position
(Format)	<1Fh> <43h> <n>
(Comments)	If n = 0, cut command will cut under last printed line. If n = 1, cut command will cut over last printed line. 0 <= n <= 1 Default value is n = 1
(Cross reference)	ESC i, ESC m



GS w

(Description)	Set horizontal magnification of bar code
(Format)	<1Dh> <77h> <n>
(Comments)	n defines how many 1/6mm units are used to print the thin line of each barcode symbol. The thick lines will be set to twice the value of n. 2 <= n <= 4 Default value is n = 3
(Cross reference)	GS h, GS k

GS h

(Description)	Select vertical height of bar code
(Format)	<1Dh> <68h> <n>
(Comments)	The vertical height will be set to n 1/8mm units. 1 <= n <= 255 Default value is n = 162
(Cross reference)	GS k, GS w

GS k

(Description)	Print bar code
(Format)	<1Dh> <6Bh> <n> [<d>] k <00h>
(Comments)	n selects the bar code system to be used in accordance with the table below. k is the number of <d> to be sent and will vary from one bar code symbol to another.
(Cross reference)	GS w, GS h

n	Bar code symbol
0	UPC-A
1	UPC-E
2	EAN13
3	EAN8
4	Code 39
5	Interleaved 2/5 (ITF)
6	Bar code
7	Code 128A
8	Code 128B
9	Code 128C

GS f

(Description)	Select font for bar code data
(Format)	<1Dh> <66h> <n>
(Comments)	If n = 0, font A is used. If n = 1, font B is used. 0 <= n <= 1
(Cross reference)	GS H

(Description)	Select printing position of bar code data
(Format)	<1Dh> <48h> <n>
(Comments)	The value of n is used to set how the characters will be printed in accordance with the following table.
(Cross reference)	GS f

n	Printing position
0	Not printed
1	Above bar code
2	Under bar code
3	Above and under bar code

ESC &

(Description)	Define user-defined characters.
(Format)	<1Bh> <26h> <s> <n> <m> [72] (m-n+1)
(Comments)	<p>Each character is defined as an array of dots (bits) which is s-bytes high by a-bytes wide. The array contains bytes which represent the character ‘scanned’ from top to bottom and then from left to right. The first byte of the array (byte p1) represents the top-left corner of the character with the most-significant bit (MSB) at the top and the least-significant bit (LSB) seven dots below it. Where any bit of the array contains a 1, a dot will be printed, where it contains a 0, no dot will be printed. Thus s x a bytes are sent to define each character.</p> <p>The newly defined characters will overwrite the existing Ascii characters between characters 32 and 126 starting from character number n to character number m. Therefore, the character array must be sent (m-n+1) times. If only 1 character is being sent, m should be set to the same value as n. The new definitions will be retained, unless over-written by a new definition, until a reset command is sent (ESC @) or until a bit image is defined (command GS *).</p> <p>1 <= s <=3 (ie. characters are 8, 16 or 24 bits high) 32 <= n <= m <= 126 Width of the font presently selected (see command AX f) <= a <= 12 The values <p1> to <ps x a> are all single-byte numbers</p> <p>If the defined width of the new character, <a>, is less than the width of the currently-selected font, then the new font will take the same width as the current font and so will include blank spaces to its right. Therefore, this command prohibits the definition of proportional fonts. In that case, you should use the related command AX &</p>
(Cross reference)	ESC %, AX &

AX &

(Description)	Define proportional characters
(Format)	<1Fh> <26h> <s> <n> <m> [<a> <p1> <p2> ... <ps x a>] (m-n+1)
(Comments)	<p>This command works as the ESC & command but allows the definition of characters smaller than the selected font so that a proportional font may be defined.</p> <p>Each character is defined as an array of dots (bits) which is s-bytes high by a-bytes wide. The array contains bytes which represent the character ‘scanned’ from top to bottom and then from left to right. The first byte of the array (byte p1) represents the top-left corner of the character with the most significant bit (MSB) at the top and the least significant bit (LSB) seven dots below it. Where any bit of the array contains a 1, a dot will be printed, where it contains a 0, no dot will be printed. Thus s x a bytes are sent to define each character.</p> <p>The newly defined characters will overwrite the existing Ascii characters between characters 32 and 126 starting from character number n to character number m. Therefore, the character array must be sent (m-n+1) times. If only 1 character is being sent, m should be set to the same value as n. The new definitions will be retained, unless over-written by a new definition, until a reset command is sent (ESC @) or until a bit image is defined (command GS *).</p> <p>1 <= s <=3 (ie. characters are 8, 16 or 24 bits high) 32 <= n <= m <= 126 0 <= a <= 16 The values <p1> to <ps x a> are all single-byte numbers</p>
(Cross reference)	–

ESC %

(Description)	Enable / disable user-defined character set
(Format)	<1Bh> <25h> <n>
(Comments)	<p>If n is odd, the user-defined set is selected.</p> <p>If n is even, the user defined set is cancelled (the internal set is used).</p> <p>Default value is n = 0.</p> <p>The user-defined character set and a downloaded bit image can not be defined at the same time.</p>
(Cross reference)	ESC & (define character set)

GS *

(Description)	Define down-loaded bit image
(Format)	<1Dh> <2Ah> <n1> <n2> [<d>] k
(Comments)	<p>The bit image is defined as an array whose width is 8 x n1 bytes and whose height is n2 bytes.</p> <p>As for the user-defined characters, the image data, [<d>], is defined with the MSB at the top and with data sent to represent the image “scanned” from top to bottom and then left to right. Therefore, there will need to be k bytes of data sent to make up the entire image, where $k = (n1 + n2 \times 8)$</p> <p>1 ≤ n1 ≤ 255 1 ≤ n2 ≤ 48 n1 x n2 ≤ 1311</p> <p>Note that the maximum size image that can be printed is if n1 is 56; however, for software compatibility with older printers the maximum value possible is 255. If the logical image is larger than what can be physically printed then only part of the image will be printed, and the other data will be ignored.</p> <p>The bit image will remain valid until ESC @ or ESC & or FS 2 is executed or a new image is loaded.</p>
(Cross reference)	GS /

GS /

(Description)	Print down-loaded bit image
(Format)	<1Dh> <2Fh> <m>
(Comments)	<p>The bit image defined by the command GS □ is printed in accordance with the table below and depending on the value of the mode byte <m>.</p> <p>0 ≤ m ≤ 3</p>
(Cross reference)	GS *

m	Mode
0	Normal
1	Double width
2	Double height
3	Double width and double height

(Description)	Print bit image
(Format)	<1Bh> <2Ah> <m> <n1> <n2> [<d>] (k x n)
(Comments)	<p>The mode of printing the bit image is defined by the value of m as given in the table below. m = 0, 1, 32 or 33 Beware that if an invalid value of m is sent, the command will be ignored and the following bytes may be interpreted as either printable or control characters.</p> <p>The bit image itself is defined as an array whose height is n bytes where for m = 0 or 1: n = 1 for m = 32 or 33: n = 3</p> <p>The width is defined by the double-byte number <n1> <n2>. In normal density, 1 bit represents a width of 2 dots but in double density, 1 bit represents a width of 1 dot so the width of the data array is therefore k bytes where</p> <p>$k = (n1 + n2 \times 256)$ When m = 0 or 32: $0 \leq k \leq 288$ When m = 1 or 33: $0 \leq k \leq 576$</p> <p>As for the user-defined characters, the image data, [d], is defined with the MSB at the top and with data sent to represent the image “scanned” from top to bottom and then left to right. Therefore, there will need to be (k x n) bytes of data sent to make up the entire image. If k exceeds the values given above, subsequent data transfers will be ignored.</p>
(Cross reference)	–

m	Mode	Vertical direction		Horizontal direction	
		# Dots	Density	# Dots Max	Density
0	8 dot single density	8	2 dots/mm	288	3 dots/mm
1	8 dot double density	8	2 dots/mm	576	6 dots/mm
32	24 dot double density	24	6 dots/mm	288	3 dots/mm
33	24 dot double density	24	6 dots/mm	576	6 dots/mm



ESC p

(Description)	Generate solenoid pulse
(Format)	<1Bh> <70h> <m> <n1> <n2>
(Comments)	<p>Generates a pulse on pin m of the drawer kick-out connector in accordance with the table below.</p> <p>n1 x 2 ms is the on-time of the pulse. n2 x 2 ms is the off-time of the pulse. 0 <= n1 <= n2 <= 255</p>
(Cross reference)	–

m	Connector	Pin
0	1	2
1	1	5
2	2	2
3	2	5

ESC u

(Description)	Transmit cash drawer status
(Format)	<1Bh> <75h> <n>
(Comments)	<p>To request status of drawer 1, set n=0 To request status of drawer 2, set n=1 0 <= n <= 1</p> <p>The printer returns a single byte. If the return byte is o (zero) the drawer is closed. If the return byte is non-zero, the drawer is opened.</p> <p>This command is ignored if the printer is fitted with a Centronics interface because Centronics is not bi-directional.</p>
(Cross reference)	–

GS C0

(Description)	Select counter print mode
(Format)	<1Dh> <43h> <30h> <m> <n>
(Comments)	<p>Sets the format of how the counter is printed.</p> <p>$0 \leq m \leq 5$ If $m = 0$, all digits of the counter will be printed, otherwise <m> of the least-significant digits will be printed. The default value is $m=0$</p> <p>$0 \leq n \leq 2$ The value of <n> describes how the printed counter value will be justified as shown in the table below. Both m and n are ignored if out of range.</p>
(Cross reference)	GS c, GS C, GS C1, GS C2

n	Adjustment	Empty digits filled
0	right	with spaces
1	right	with 0s
2	left	with spaces

GS C1

(Description)	Select binary counter mode
(Format)	<1Dh> <43h> <31h> <n1> <n2> <n3> <n4> <n5> <n6>
(Comments)	<p>The start value of the counter is start = $(n1 + n2 \times 256)$, default value is 1 The end value of the counter is end = $(n3 + n4 \times 256)$, default value is 65535</p> <p>If start > end, the counter will increment after each time the command GS c is used. If end > start, the counter will decrement after each time the command GS c is used. When the counter exceeds the value of end it will reset to the value of start.</p> <p>The increment or decrement step is the value of n5. Setting this value to 0 will stop the counter.</p> <p>The counter will reset to the value start only n6 times. After this, it will stop counting. Also, setting this value to 0 will stop the counter.</p> <p>$0 \leq n1, n2, n3, n4, n5, n6 \leq 255$</p>
(Cross reference)	GS C0, GS C2, GS c, GS C

GS C2

(Description)	Set binary counter value
(Format)	<1Dh> <43h> <32h> <n1> <n2>
(Comments)	<p>Counter value = $n1 + n2 \times 256$ Default values are $n1 = 1$, $n2 = 0$</p> <p>If the counter value is out of range, it will be converted to the maximum (if counting-down) or minimum (if counting-up) value defined by GS C1 or GS C.</p>
(Cross reference)	GS C0, GS C1, GS C, GS c

GS C

(Description)	Select decimal count mode
(Format)	<1Dh> <43h> <3Bh> <n1> <3Bh> <n2> <3Bh> <n3> <3Bh> <n4> <3Bh> <n5> <3Bh>
(Comments)	<p>With this counter, all parameters are entered as binary-coded decimal digits and separated by a semi-colon character, <3Bh>. Any omitted parameter will keep its previous value.</p> <p>n1 is the start value of the counter n2 is the end value of the counter The counter will initially take the value given by n5</p> <p>If start > end, the counter will increment after each time the command GS c is used. If end > start, the counter will decrement after each time the command GS c is used. When the counter exceeds the value of end it will reset to the value of start.</p> <p>The increment or decrement step is the value of n3. Setting this value to 0 will stop the counter. The counter will reset to the value start only n4 times. After this, it will stop counting. Also, setting this value to 0 will stop the counter.</p> <p>$0 \leq n1, n2, n5 \leq 65535$ $0 \leq n3, n4 \leq 255$</p>
(Cross reference)	GS C0, GS C1, GS C2, GS c

GS c

(Description)	Print counter value
(Format)	<1Dh> <63h>
(Comments)	Puts the current value of the counter in the print buffer & updates the counter. The format of the printed value is set by the GS C0 command.
(Cross reference)	GS C, GS C0, GD C1, GS C2

GS :

(Description)	Set start / end of macro definition
(Format)	<1Dh> <34h>
(Comments)	The macro definition starts and ends with this command. The length of the macro must not exceed 2048 bytes.
(Cross reference)	GS ^

GS ^

(Description)	Execute macro
(Format)	<1Dh> <5Eh> <n1> <n2> <n3>
(Comments)	The macro defined between the GS: commands will be executed n1 times. t is the time to wait before executing the macro where the time t is given by $t = n2 \times 100 \text{ ms}$ n3 specifies the way to execute the macro in accordance with the table below.
(Cross reference)	GS :

n3	Executing mode
0	Continuous mode: The macro is executed n1 times with interval t between each execution.
1	Paper feed button mode: After waiting t, the led blinks and the printer waits for the paper feed button to be pushed to execute the macro. This operation is repeated n1 times.

FS !

(Description)	Specifies Kanji print mode
(Format)	<1Ch> <21h> <n>
(Comments)	0 ≤ n ≤ 255 The value of n can be set to vary the mode of print according to the table below. Default value is n = 0

Bit	Function	Bit = 0	Bit = 1
0	(not used)	-	-
1	(not used)	-	-
2	Double height	Cancelled	Set
3	Double width	Cancelled	Set
4	(not used)	-	-
5	(not used)	-	-
6	(not used)	-	-
7	Underlined	Cancelled	Set

FS &

(Description)	Specifies Kanji mode
(Format)	<1Ch> <26h>
(Comments)	Valid if self test detects the special added Kanji board which means : KANJI SET = ON
(Cross reference)	

FS -

(Description)	Specifies Kanji underlined mode
(Format)	<1Ch> <2Dh> <n>
(Comments)	0 ≤ n ≤ 2
(Cross reference)	

n	Function
0	cancels underlined Kanji
1	1 dot underlined Kanji
2	2 dots underlined Kanji

FS .

(Description)	Cancels Kanji mode
(Format)	<1Ch> <2Eh>
(Comments)	
(Cross reference)	

FS S

(Description)	Specifies Kanji space amount
(Format)	<1Ch> <53h> <n1> <n2>
(Comments)	0<= n1 <= 32 0<= n2 <= 32
(Cross reference)	n1 defines left space in dots n2 defines right space in dots

FS W

(Description)	Specifies Kanji 4 fold mode
(Format)	<1Ch> <57h> <n>
(Comments)	0<= n<= 255
(Cross reference)	

n	Function
0	cancels 4 fold Kanji
1	specifies 4 fold Kanji

FS 2

(Description)	Specifies external character
(Format)	<1Ch> <32h> <a1> <a2> <Dn>
(Comments)	(see next page)
(Cross reference)	



Defining the external characters FS + '2' + a1 + a2 + Dn

Kanji characters are downloaded one by one

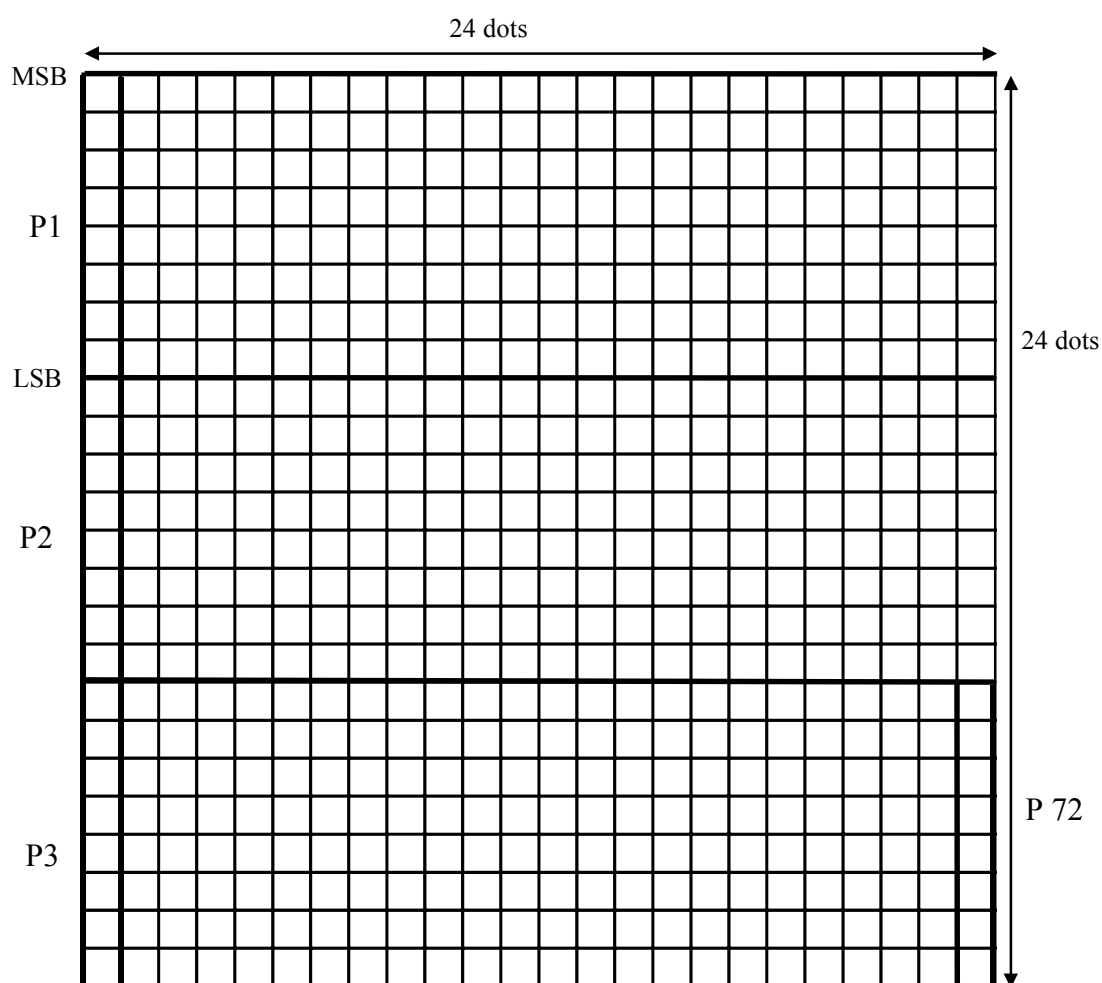
Code: 1Ch + 32h + a1 + a2 + Dn

a1 = 77h or 78h

a2 = 21h to 7Eh (meaning 94 characters)

Dn = p1, p2, p3 ... p72 (= 72 data kanji 24 × 24)

A1	Modify font user (see code ESC &)
77h	Font user A
78h	Font user B



If images are loaded, they use downloading fonts (see page 31 ESC &)

If a problem occurs in downloading mode (for row or column code), printer indicates ! + 36 data in Kanji mode, and !* + 72 data in ascii mode.

7 SPARES

All spare parts kits are supplied as individually packaged loose parts. It is possible to obtain different groups of spare parts kits. AXIHOM customer service will provide the list later.

Reference	Designation	Contents
3101046 For Products:	DOOR OPEN SWITCH KIT APOSY20E, APOSY20G	Door switch (x1)
3101047 For Products:	KNIFE SWITCH KIT APOSY20E, APOSY20G	Micro switch without lever (x1)
3101051 For Products:	PAPER GUIDE KNIFE KIT APOSY20E, APOSY20G	Upper paper guide (x1)
3101052 For Products:	PRINT HEAD SPRING KIT APOSY20E, APOSY20G	Print head spring (x1)
3101053 For Products:	COVER SPRING KIT APOSY20E, APOSY20G	Cover spring (x1)
3102263 For Products:	PAPER FEED MOTOR KIT APOSY20E, APOSY20G	Stepper motor (x1)
3102264 For Products:	COVER OPEN SWITCH KIT XPGE/APOSS APOSY20E, APOSY20G	Cover switch (x1)
3102265 For Products:	PAPER OUT KIT APOSS APOSY20E, APOSY20G	Equipped opto sensor support (x1)
3102268 For Products:	CABINET BASE KIT CHARCOAL APOSS APOSY20E, APOSY20G	Charcoal bottom frame (x1) Anti-slip pad (x4) Cable clip (x3)
3102269 For Products:	GROUND KIT XPGE/APOSS APOSY20E, APOSY20G	Ground flex (x1)
3103100 For Products:	POWER SUPPLY KIT GB APOS APOSY20G	GB power supply (x1)
3103101 For Products:	POWER SUPPLY KIT FR APOS APOSY20E	European power supply assembly (x1)



3103211	PRINT HEAD KIT 8 DOTS/MM ~ to be created	8 dots/mm print head (x1)
For Products:		
3103212	EQUIPPED PLATEN KIT ~ to be created	platen (x1)
For Products:	APOSY20E, APOSY20G	Platen gear (x1)
3104129	TOP ASSEMBLY KIT APOSS001	Light gray top assembly (x1)
For Products:	APOSY20E, APOSY20G	
3105803	PAPER FEED BIPOLAR MOTOR KIT	Bipolar motor (x1)
For Products:	APOSY20E, APOSY20G	
3107094	FITTED PLATEN KIT APOXCKJ	Molded platen (x1)
For Products:	APOSY20E, APOSY20G	Platen gear (x1)
PSUI5000	50W POWER SUPPLY KIT W/O CABLE APOS	50W power supply (x1)
For Products:	APOSY20G	
PSUI500E	50W POWER SUPPLY KIT W/CABLE APOS	European 50W power supply assembly (x1)
For Products:	APOSY20E	

* Screws, washers, rivets and any other small hardware not mentioned in the contents list are supplied with the kits when needed.